June 7, 2022

9-11am EDT
Opening Remarks – Tim Wilson (NESC Director)

Keynote Speech – Scott Tingle (NASA Artemis Astronaut & NESC Chief Astronaut)

Objectives of the workshop and deliverables – Azita Valinia (NESC Chief Scientist)

Lunar Discovery & Exploration Program and Near-term Artemis Science – Joel Kearns (Deputy Associate Administrator for Exploration, NASA Science Mission Directorate)

Overview of Artemis Program… and how it enables science – Jake Bleacher (NASA HQ)

Unique Science from the Moon Overview – Jim Green (NASA)

Break 11-11.15am EDT

11.15am-2.30pm EDT (includes lunch break)
Science Concept Case Studies already funded by NASA SMD & STMD – Moderated by Nick White (Webex moderator: Mark Matsumura)

Focus is on low frequency radio telescope concepts that is identified as an area of discovery in Astro2020 and currently of high interest to both NASA and DoE, as well as heliophysics science applications.

- LuSEE – Stuart Bale (U. of California, Berkeley)
- FARSIDE – Jack Burns (U. of Colorado, Boulder)
- Lunar Crater Radio Telescope (LCRT) – Saptarshi Bandyopadhyay (JPL)
- FarView – Ron Polidan (Lunar Resources Inc.)
- Discussion

Break 2.30-2.50pm EDT

2.50-4.45pm EDT
Round table discussion - Moderated by Jack Burns (Webex moderator: Mark Matsumura)

- International participation – Marc Klein-Wolt (Radboud University, Netherlands)
- Inter-Agency activities with DoE – Anže Slosar (Brookhaven National Lab)
- Spectrum Environment and Management for Radio Observations – Cathy Sham (NASA Lunar Spectrum Manager)
- Site Selection for Radio Telescopes – Jack Burns (U. of Colorado)
- Discussion

4.45-5pm EDT
End of Day Wrap Up – Take-Aways Azita Valinia & Nick White

6.30pm Workshop Dinner (Fishlips Waterfront Grill – Cape Canaveral)

June 8, 2022

9-10am EDT
Keynote Speech: Synergy between Robotics and Human Exploration – John Grunsfeld (Former NASA SMD Associate Administrator and astronaut)

10-10.20am
Break – Workshop Photo

10.20am-12.30pm EDT
Challenges of the Lunar environment - Moderated by Jon Haas (Webex moderators: Tim Brady and John Hanson)

- Dust and Charging – Kristen John (NASA JSC) et al.

- Extreme Thermal Environment –Erik Stalcup (NASA GRC), Angela Krenn (NASA KSC) et al.
- Power Generation and Storage – Ryan Edwards (NASA GRC) et al.
- Lessons Learned for Instrument Design & Deployment from Apollo Era - Harrison Schmitt

12.30-1.30pm EDT Lunch Break

1.30-4.15pm EDT
Challenges associated with human intervention involving assembly and servicing of scientific experiments - Moderated by John Grunsfeld and Mike Hess (Webex Moderators: Mark Terrone and Chris Broadaway)

- Needed human space flight infrastructure – Carey McCleskey (NASA KSC)
  - Surface Architecture Functions Associated with Sustained Human/Robotic Science Operations
  - Surface Site Planning - Science Objectives, Constraints and Considerations (Base Camp vs. Sortie)
  - Overview Human/Robotic Operations and Support Functions
  - Surface Science Facility Deployment - Cargo/Material Handling, Construction, and Assembly Considerations
  - Robotic and/vs Human Deployment of Science Facilities
- Astronaut Requirements for assembly and servicing – Jackie Kagey (NASA JSC)
  - Human space flight infrastructure
  - EVA requirements
  - Robotics interaction
  - EVA onsite activities, identification of sites, maintenance
- Cost Challenges and Opportunities – Nick White, Carol Grunsfeld, Jay Bookbinder
  - Partnership Model – Nick White
  - Task Based (e.g. Build, Repair) Human vs. Robotics – Jay Bookbinder
  - Infrastructure & Capabilities Strategic Investments – Carol Grunsfeld

4.15-4.30pm EDT
End of Day Wrap Up – Take-Aways Azita Valinia & Nick White

6.30pm Workshop Dinner (Grills Seafood Deck – Cape Canaveral)

June 9, 2022

9am-1pm EDT
Engineering Challenges and Discussion – Led by Jon Haas (Webex moderators: Tim Brady and John Hanson)

- Communication & Navigation – Jim Schier (NASA HQ) et al.
  - LunaNet Overview
- Worksite Design and Lighting – Charlie Dischinger et al. (NASA MSFC)

Engineering challenges summary and risk mitigation approaches

Capabilities and Infrastructure Summary and Discussion – Led by John Grunsfeld & Mike Hess (Webex moderators: Mark Terrone and Chris Broadaway)
Robotics delivery (CLPS), what could CLPS 2.0 look like in 2030+? (assembly and servicing of experiments using a combination of robotics and human intervention)

- Astronaut assembly and servicing (Artemis)
- Sustained presence capabilities (Artemis Base Camp)
- In Situ Utilization applied to science
- Maintaining radio quiet environment
- Robotic vs human development of science facilities (trades and benefits)
  - What is the role of humans in the process?
  - How much value do humans add in the process? Risk and cost comparison?
- Sensors and instrumentation - Buildup & Planning, Operations, Clean-up

Drivers for Artemis Systems Requirement and Discussion – Led by Renee Weber & Nick White (Webex moderator: Mark Matsumura)

- Leveraging the Artemis infrastructure
- Spectrum of robotic vs human assembly and servicing
- Engineering Challenges: Knowledge gaps
- Required investments

Workshop Integration and Final Report – Azita Valinia and Nick White

- Report outline and writing assignments

Wrap Up – All